

DOCTOR OF PHILOSOPHY

AN AGENT BASED ARCHITECTURE FOR GENERATING INTERACTIVE STORIES

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The Department of Defense relies on modeling and simulation for a variety of purposes, including joint exercise training, developing and evaluating doctrine and tactics, and studying weapon system effectiveness. Advances in technology have made the achievement of technically and visually accurate simulations possible, but little has been done to present realistic scenarios while supporting user interaction. This dissertation describes a multi-agent interactive simulation engine for generating interactive scenarios or stories. A general-purpose multi-agent system simulation architecture called a Connector-based Multi-Agent System (CMAS) is developed and presented, along with a software agent communication and coordination mechanism. In this architecture, stories are generated through discovery as a by-product of agent interactions, rather than being fixed in advance. The ensuing story adapts to the user's interventions and is closely aligned to the goals of the agents. The multi-agent system design of the story engine has resulted in a data-driven simulation engine, which is domain independent and highly scalable.

The story engine is fielded as the underlying simulation engine behind the U.S. Army's *America's Army: Soldiers* project. The instantiation of the story engine as it applies to *Soldiers* is presented. As a component of *Soldiers*, the story engine is an integral module in an interactive story generation system.

KEYWORDS: Multi-Agent System, Multi-Agent Simulation, Interactive Simulation, Scenario-Based Training, Interactive Stories, Interactive Narrative